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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,923	08/17/2006	Stefan Amon	092771-0220	3761

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EXAMINER	
HORNING, JOEL G	
ART UNIT	PAPER NUMBER
1712	

NOTIFICATION DATE	DELIVERY MODE
04/10/2012	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/589,923	AMON ET AL.	
	Examiner	Art Unit	
	JOEL G. HORNING	1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 May 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,6-10 and 20-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4,6-10 and 20-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 05-17-2011 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. **Claims 1, 20 and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Brennan (US 2596364, hereafter referred to as '364) in view of Durbin (US 4324312)

'364 teaches producing a membrane which can be used with an electroacoustic transducer (col 1, lines 1-20). It teaches forming the membrane by applying a plastic binding material to the membrane, such as specifically thermally curing plastics (col 5, lines 40-45). This plastic binding material is provided in a liquid form (col 3, lines 4-10). As seen in figure 1, different nozzles **16** are used to apply the plastic to different radial regions of the diaphragm. It even demonstrates using different nozzles for at least three different radial areas of the diaphragm. It further teaches then heating the deposited plastic material under pressure which allows it to form into the desired shape (col 2, lines 40-50) and would also make the binder distribute more evenly on the membrane surface. It further teaches that this also permits thermal setting binders to then cure (col 5, lines 40-45). '364 does not specifically teach using the claimed diaphragm structure with its three radial areas.

However, Durbin is also directed towards methods of constructing speaker diaphragms (title and abstract) and, as shown in figures 1 and 4, it teaches that the membrane includes a central area **21**, a creased area which includes **20, 30, and 48** situated to surround the central area **21**. Furthermore, between these two regions can be defined a transition region (for instance, near **40**) which is coupled to a moving coil of the electroacoustic transducer **24** (col 2, line 59 through col 3, line 28).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use such Durbin design features for the speaker diaphragm coated by '364, since such a construction was conventionally known to the art and would produce predictable and successful results.

Regarding the requirement that there exist a nozzle in each region that is only used to coat material in that particular radial area of the substrate (the center, transition and creased regions). As shown in figure 1, '364 teaches using different nozzles for different radial zones (including exemplifying at least three such areas, although more could be used, col 2, lines 48-52).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to define the three claimed areas as portions of the diaphragm, such that only one of the three nozzles shown in figure 1 are used to deposit liquid plastic in each area with different nozzles used for different areas **(claim 1)**.

3. Alternately, it is obvious to include a sufficient number of nozzles in the process such that, in each of those three areas, there is a nozzle which only deposits material in that area because mere duplication of parts has no patentable significance unless a new or unexpected result is produced.

In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960) (Claims at issue were directed to a water-tight masonry structure wherein a water seal of flexible material fills the joints which form between adjacent pours of concrete. The claimed water seal has a "web" which lies in the joint, and a plurality of "ribs" projecting outwardly from each side of the web into one of the adjacent concrete slabs. The

prior art disclosed a flexible water stop for preventing passage of water between masses of concrete in the shape of a plus sign (+). Although the reference did not disclose a plurality of ribs, the court held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced.)**(claim 1)**

4. Regarding **claim 20**, '364 teaches applying different amounts of liquid plastic in the different radial areas (including the first through third claimed ones) in order to control the stiffness in each area (col 5, line 73 through col 6, line 3)

5. Regarding **claim 21**, '364 teaches using different materials for the different areas of the diaphragm in order to control the properties in each area to be optimal for that area (col 3, lines 64-67).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use different polymer materials for each of the three different regions taught in Durbin in order to produce optimal properties for those regions.

6. **Claims 1, 4, 7, 8, 20 and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Brennan (US 2596364, hereafter referred to as '364) in view of Durbin (US 4324312) further in view of Nonaka (JP-04120900, as shown by the Derwent English abstract) in view of in view of Kishima (US 4668588) in view of Fukazawa et al (JP 01193847, as shown by the Derwent English abstract).

'364 does not teach applying a UV curable resin to their diaphragm

Nonaka is directed towards a method for stiffening and improving the weather resistance of a speaker diaphragm (electro acoustic transducer) by further coating it with a polymer layer. In the process, a liquid solution (70% toluene) of a polymer is

spray coated onto both faces of the polymer diaphragm of a speaker so that it adheres there. The polymer is then cured by exposure to UV light.

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to further apply the UV curable coating of Nonaka onto the diaphragm of '364 in order to impart weather resistance to the diaphragm. Further it would be obvious to do so using the deposition setup of '364, since it was particularly designed for spray coating such diaphragms.

Nonaka does not teach heating the liquid plastic that has been applied onto the surface of the substrate before curing it.

However, Kishima is also directed towards using UV curable polymer solutions (UV curable paint) in order to form polymeric layers (paint layers) (abstract). It teaches that after the liquid polymer layer is deposited the solvent should be removed, by heating the layer for some time, before UV curing (col 5, lines 45-58) in order to improve the surface properties of the resulting polymer layer (col 6, lines 7-12).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to heat the deposited liquid polymer layer for some time before UV curing it in order to remove the solvent from the layer and produce a cured polymer layer with better surface properties.

Furthermore, Fukazawa et al is also directed towards methods of effectively applying and curing UV curable liquid polymer resins onto substrates. It teaches that in order to improve the uniformity of the polymer layer formed from the liquid UV

curable resin, it is important to control the viscosity of the liquid polymer before it is cured. It teaches that the viscosity is affected by the temperature and so teaches heating the liquid polymer which produces a (lower) viscosity that allows a more uniform coating to be produced (abstract).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to expect that heating the liquid polymer would also produce the benefit of creating a more uniform coating, since it was known that doing so would enable a more uniform coating **(claims 1 and 4)**.

7. Regarding **claim 7**, as indicated by Kishima, the waiting time (drying time) is a result effective variable for determining the degree of drying (for a given solvent, volume of solvent and temperature). Additionally, drying time is also a result effective variable for determining the length of the coating process. Shorter dying times result in a faster process, but may not dry the coating sufficiently. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to choose the instantly claimed ranges of "between 1 and 15 seconds" through process optimization, since it has been held that when the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). Additionally, this indicates that this chosen optimal processing time would be different than the optimal processing time for a process with a different processing parameters (e.g. a different amount of solvent or temperature).

8. **Claim 8** further requires that greater waiting times be used for a roughened surface than a smooth surface. Nonaka in view of the '462 patent shows that it is obvious to have different coating thicknesses on the speaker. As applied to claim 7 in the previous rejection, Kishima teaches that the waiting time (drying time) is a result effective variable. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to choose the instantly claimed ranges of "greater than the waiting time in the case of a membrane having a smooth surface" through process optimization, since it has been held that when the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980) **(claim 8)**.

9. **Claims 20 and 21** are rejected for the same reasons they were previously, but under the teaching of Nonaka, specifically with the Nonaka polymers being included in the different areas.

10. **Claims 6 and 10** are rejected under 35 U.S.C. 103(a) as being unpatentable Brennan (US 2596364, hereafter referred to as '364) in view of Durbin (US 4324312) further in view of Brennan (US 2408038, hereafter referred to as "the '038 patent").

Claim 6 further requires that a membrane or the device for applying the liquid plastic be moved during application of the liquid plastic.

'364 teaches spraying the liquid plastic onto the speaker membrane, but does not describe exactly how that operation occurs.

However, the '038 patent is also directed towards spraying liquid polymers (binder) (col 2, lines 49-52) onto speaker diaphragms (col 1, lines 6-9). It teaches

that one suitable way of doing this is by placing the membrane on a turntable and rotating it (as can be seen in figure 4, the turntable is symmetrical about the diaphragm's central axis, so it will rotate on the central axis) while spraying the liquid polymer on the membrane. By spraying the coating this way, a substantially uniform coating is produced (col 5, lines 14-20).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to rotate the membrane during spraying in order to produce a more controlled uniform coating of the membrane **(claim 6)**.

Furthermore, the '038 patent teaches performing multiple layer deposition steps in order to produce the desired film thickness and to enable the deposition of more complex thickness profiles (masking) (col 5, lines 21-32).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to deposit the desired film thickness on the membrane by performing a succession of layer deposition steps (deposit and cure one polymer layer and then deposit and cure another layer) instead of a single step since it was a known way to deposit layer of the desired thickness and would produce predictable results and in order to enable the formation of more complicated thickness profiles on the rotating membrane **(claim 10)**.

11. **Claims 6 and 10** are alternately rejected under 35 U.S.C. 103(a) as being unpatentable over Brennan (US 2596364, hereafter referred to as '364) in view of Durbin (US 4324312) further in view of Nonaka (JP-04120900, as shown by the Derwent English abstract) in view of in view of Kishima (US 4668588) in view of

Fukazawa et al (JP 01193847, as shown by the Derwent English abstract) further in view of Brennan (US 2408038, hereafter referred to as "the '038 patent").

Claim 6 further requires that a membrane or the device for applying the liquid plastic be moved during application of the liquid plastic.

'364 teaches spraying the liquid plastic onto the speaker membrane, but does not describe exactly how that operation occurs.

However, the '038 patent is also directed towards spraying liquid polymers (binder) (col 2, lines 49-52) onto speaker diaphragms (col 1, lines 6-9). It teaches that one suitable way of doing this is by placing the membrane on a turntable and rotating it (as can be seen in figure 4, the turntable is symmetrical about the diaphragm's central axis, so it will rotate on the central axis) while spraying the liquid polymer on the membrane. By spraying the coating this way, a substantially uniform coating is produced (col 5, lines 14-20).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to rotate the membrane during spraying in order to produce a more controlled uniform coating of the membrane **(claim 6)**.

Furthermore, the '038 patent teaches performing multiple layer deposition steps in order to produce the desired film thickness and to enable the deposition of more complex thickness profiles (masking) (col 5, lines 21-32).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to deposit the desired film thickness on the membrane by performing a succession of layer deposition steps (deposit and cure one polymer

layer and then deposit and cure another layer) instead of a single step since it was a known way to deposit layer of the desired thickness and would produce predictable results and in order to enable the formation of more complicated thickness profiles on the rotating membrane **(claim 10)**.

12. **Claims 9 and 10** are rejected under 35 U.S.C. 103(a) as being unpatentable over Brennan (US 2596364, hereafter referred to as '364) in view of Durbin (US 4324312) further in view of Nonaka (JP-04120900, as shown by the Derwent English abstract) in view of in view of Kishima (US 4668588) in view of Fukazawa et al (JP 01193847, as shown by the Derwent English abstract) further in view of Bozak (US 3093207).

Claim 9 further requires that the thickness ratio of the deposited layer and the membrane be between 0.5:1 and 3:1.

Nonaka does not appear to teach what the thickness ratio should be. However, Bozak is also directed towards methods for coating speaker diaphragms with polymer layers in order to stiffen the diaphragm (col 2, lines 22-53). Bozak further teaches that the ratio of the thickness of the deposited layers and the membrane will affect the resonance of the diaphragm. The ratio should be high enough to produce the desired stiffening of the diaphragm to dampen undesirable internal vibrations, but small enough not to dampen out desired sounds (col 1, lines 23-33 with col 2, line 65 to col 2, line 11). Put another way this ratio is a result effective variable for determining the desired acoustics of the speaker diaphragm.

The ratio should be large enough to dampen undesired sounds, while small enough not to dampen the desired ones.

Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to choose the instantly claimed ranges of "between 0.5:1 and 3:1" through process optimization, since it has been held that when the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980) **(Claim 9)**.

13. Regarding **claim 10**, Nonaka does not appear to teach depositing multiple polymer layers onto the membrane. However, Bozak teaches that the polymer layer should be applied to both sides (twice) of the membrane in order to produce the best acoustics (col 2, lines 33-45).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to apply the liquid plastic to the diaphragm and cure it a number of times (coat one side of the diaphragm and repeat the coating process on the other side of the diaphragm) in order to produce the best acoustics **(claim 10)**.

14. **Claim 22** is rejected under 35 U.S.C. 103(a) as being unpatentable over Brennan (US 2596364, hereafter referred to as '364) in view of Durbin (US 4324312) in view of Nonaka (JP-04120900, as shown by the Derwent English abstract) in view of in view of Kishima (US 4668588) in view of Fukazawa et al (JP 01193847, as shown by the Derwent English abstract) further in view of Asif (European Polymer Journal **39** (2003)

933-938) as evidenced by the definition of "ultraviolet" (retrieved from dictionary.com June 3rd, 2010).

As discussed previously Nonaka teaches using a UV curable polymer, specifically exemplifying polyphosphazene resins with toluene solvents. Nonaka does not appear to specifically teach using UV curable acrylate liquid polymer coatings.

However, Asif is also directed towards UV curable liquid polymer coating materials. It teaches that there are many different UV curable liquid polymer coating materials known to the art, including many UV curable acrylate polymers. It further teaches that there are many different acrylate systems which enable the use of water as a solvent, which avoids the environmental and legislative issues of using resin systems that use organic solvents (introduction). As evidenced by the dictionary.com definition, ultraviolet radiation is the range of wavelengths less than 400nm. MPEP 2144.05 states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists."

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use a UV curable acrylate liquid polymer as a known alternate UV curable resin which was known to be suitable as a coating material and would produce predictable results. Additionally, such a person would be motivated to do so in order to avoid using organic solvents in their process and the environmental and legislative issues that would result from them **(claim 22)**.

Response to Arguments

15. Applicant's arguments with respect to claims 1, 4, 6-10 and 20-22 have been considered but are not convincing due to the new rejection necessitated by amendment.

Applicant's arguments are solely directed towards the newly claimed limitations. However, these limitations are also considered obvious as has been detailed in the new rejection above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL HORNING whose telephone number is (571)270-5357. The examiner can normally be reached on M-F 9-5pm with alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael B. Cleveland can be reached on (571)272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JOEL G HORNING/
Examiner, Art Unit 1712

/David Turocy/
Primary Examiner, Art Unit 1717